Criteria for Retrieval, Processing, Handling, and Storage of Records from Nuclear Facility Seismic Instrumentation

An American National Standard

ANSI/ANS-2.10-2017

Published by the
American Nuclear Society
555 N. Kensington Ave
La Grange Park, IL 60526

American National Standard
Criteria for Retrieval, Processing, Handling, and Storage of Records from Nuclear Facility Seismic Instrumentation

Secretariat
American Nuclear Society

Prepared by the
American Nuclear Society
Standards Committee
Working Group ANS-2.10

Published by the
American Nuclear Society
555 North Kensington Avenue
La Grange Park, Illinois 60526 USA

Approved December 19, 2017
by the
American National Standards Institute, Inc.

American National Standard

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Published by

American Nuclear Society
555 North Kensington Avenue
La Grange Park, Illinois 60526 USA

Printed in the United States of America

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Foreword

(This foreword is not a part of American National Standard "Criteria for Retrieval, Processing, Handling, and Storage of Records from Nuclear Facility Seismic Instrumentation," ANSI/ANS-2.10-2017, but is included for informational purposes.)

The purpose of this standard is to specify criteria for the treatment of records obtained from nuclear facility analog and digital strong-motion seismic instrumentation. A nuclear facility is defined as any facility that, as a result of its operation, generates waste material containing or potentially containing radioactive materials. This includes, but is not limited to, nuclear power plants, hospitals, fuel fabrication facilities, fuel reprocessing facilities, radioactive waste disposal facilities, industrial facilities, and research facilities. The principal function of the seismic instrumentation covered in this standard is to address issues that have a significant bearing on safety or mitigate the consequences of accidents that could result in potential off-site exposures. For light-water-cooled nuclear power plants, seismic instrumentation is specified in ANSI/ANS-2.2-2016, "Earthquake Instrumentation Criteria for Nuclear Power Plants." For non-power nuclear facilities, seismic instrumentation, if required, is specified in facility-specific regulations, standards, and/or guidance documents.

This standard sets forth criteria on how the records obtained from strong-motion instrumentation should be retrieved, processed, handled, and stored after an earthquake. This standard does not address weak-motion instrumentation installed in some non-power nuclear facilities to measure small-magnitude ground accelerations or velocities.

Three major changes to the 2003 standard have been incorporated as below:

- this standard addresses both power and non-power nuclear facilities;
- this standard also covers the retrieval and the subsequent processing, handling, and storage of analog instrumentation data consistent with that located in older operating nuclear facilities; and
- this standard does not cover the evaluation of the records taken from seismic ground and structure motion locations used (1) to determine if the operating basis earthquake ground motion has been exceeded and (2) in long-term evaluations, if necessary; these are discussed in ANSI/ANS-2.23-2016, "Nuclear Power Plant Response to an Earthquake."

The state of the practice for nuclear power plant seismic instrumentation type, location, requirements, and surveillance is provided in ANSI/ANS-2.2-2016. The state of the practice for nuclear power plant pre-earthquake planning, post-earthquake short-term actions, determination of the earthquake damage and recommended action, post-shutdown inspections and tests, and long-term evaluations is provided in ANSI/ANS-2.23-2016. These standards can be used as guidance in assessing existing or developing new requirements and guidance for non-power nuclear facilities.

Criteria for the plant's owner or its agents are provided in connection with the following activities:

(1) retrieval of recorded data from seismic instrumentation in the event that an earthquake occurs with sufficient ground-shaking motion to activate the seismic instrumentation;

(2) correction of the recorded data to minimize non-earthquake effects;

(3) storage, handling, and maintenance of recorded data and calculations.

Currently, this standard applies to land-based nuclear power plants and non-power nuclear facilities that deploy strong-ground-motion instrumentation. This standard has been reviewed by the ANS-2.10 Working Group for its applicability to nuclear power plant seismic monitoring instrumentation based on different technologies utilized in operating nuclear power plants. The ANS-2.10 Working Group will review, from time to time, this standard's applicability to new nuclear power plants and non-power nuclear facility installations based on different technologies from current facilities and will verify that the purposes and criteria of this standard are preserved.

This standard might reference documents and other standards that have been superseded or withdrawn at the time the standard is applied. A statement has been included in the references section that provides guidance on the use of references.

This standard does not incorporate the concepts of generating risk-informed insights, performance-based requirements, or a graded approach to quality assurance. The user is advised that one or more of these techniques could enhance the application of this standard.

The first version of ANS-2.10 was approved in 2003. It was administratively withdrawn as an American National Standard in April 2013 as it did not comply with the American National Standards Institute's requirement to complete maintenance within ten years. This standard, ANSI/ANS-2.10-2017, addresses the treatment of data from both digital and analog instrumentations and incorporates changes that have occurred in the industry practice since the 2003 standard was developed.

This standard was prepared by the ANS-2.10 Working Group of the American Nuclear Society Standards Committee. All comments received were reviewed and, where possible, were incorporated. The ANS-2.10 Working Group had the following membership during its work on this standard:

J. Xu (Chair), *U.S. Nuclear Regulatory Commission*

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The Siting: Seismic Subcommittee had the following membership at the time of its approval of this standard:

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The Environmental and Siting Consensus Committee (ESCC) had the following membership at the time of its approval of this standard:

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ESCC Observer:

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Criteria for Retrieval, Processing, Handling, and Storage of Records from Nuclear Facility Seismic Instrumentation

1 Scope

This standard[1)] provides criteria for the timely retrieval and the subsequent processing, handling, and storage of data obtained from nuclear power plant and non-power nuclear facility strong-motion analog and digital seismic instrumentation.[2)] Nuclear power plant seismic instrumentation requirements are specified in ANSI/ANS-2.2-2016 [1].[3)] Non-power nuclear facility seismic instrumentation, if required, is specified in facility-specific regulations, standards, and/or guidance documents.

This standard does not address the evaluation of nuclear power plant ground and structure motion and the criteria to determine whether earthquake ground motion at the site has exceeded the plant's operating basis earthquake (OBE) ground motion. These topics are addressed in ANSI/ANS-2.23-2016 [2].

The principal function of the seismic instrumentation covered in this standard is to address issues that have a significant bearing on safety or mitigate the consequences of accidents that could result in potential off-site exposures. This standard does not address weak-motion instrumentation installed in some non-power nuclear facilities to measure small-magnitude ground accelerations or velocities.

2 Purpose

The primary purpose of this standard is to provide criteria for retrieval, processing, handling, and storage of records from nuclear facility seismic instrumentation and to specify related activities such that a high quality standard is achieved in obtaining pertinent information from the seismic instrumentation to adequately support the decision making at power and non-power nuclear facilities following an earthquake event.

This standard is intended for use at land-based nuclear power plants and non-power nuclear facilities that deploy strong-ground-motion instrumentation. It can be used for guidance at other types of nuclear facilities.

The states of the practice for nuclear power plant strong-motion seismic instrumentation and for nuclear power plant response to an earthquake are provided in Refs. [1] and [2], respectively, and can be used as guidance in assessing existing or developing new requirements and guidance for non-power nuclear facilities.

[1)] The current standard, ANSI/ANS-2.10-2017, is hereinafter referred to as "this standard."
[2)] The appendix provides guidance and commentary.
[3)] Numbers in brackets refer to corresponding numbers in Sec. 5, "References."